

Online appendix to
**Short-term impact of COVID-19 on consumption spending and
its underlying mechanisms: Evidence from Singapore**

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Seonghoon Kim
School of Economics, Singapore Management University and IZA

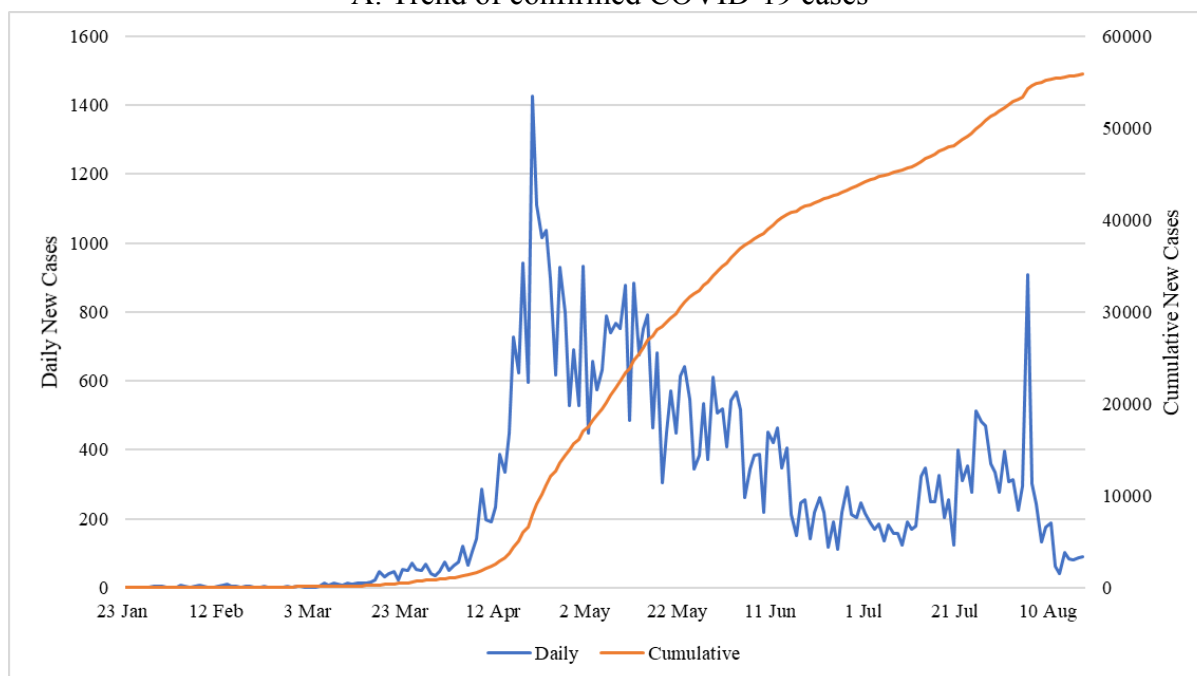
Kanghyock Koh
Department of Economics, Korea University

Xuan Zhang
School of Economics, Singapore Management University

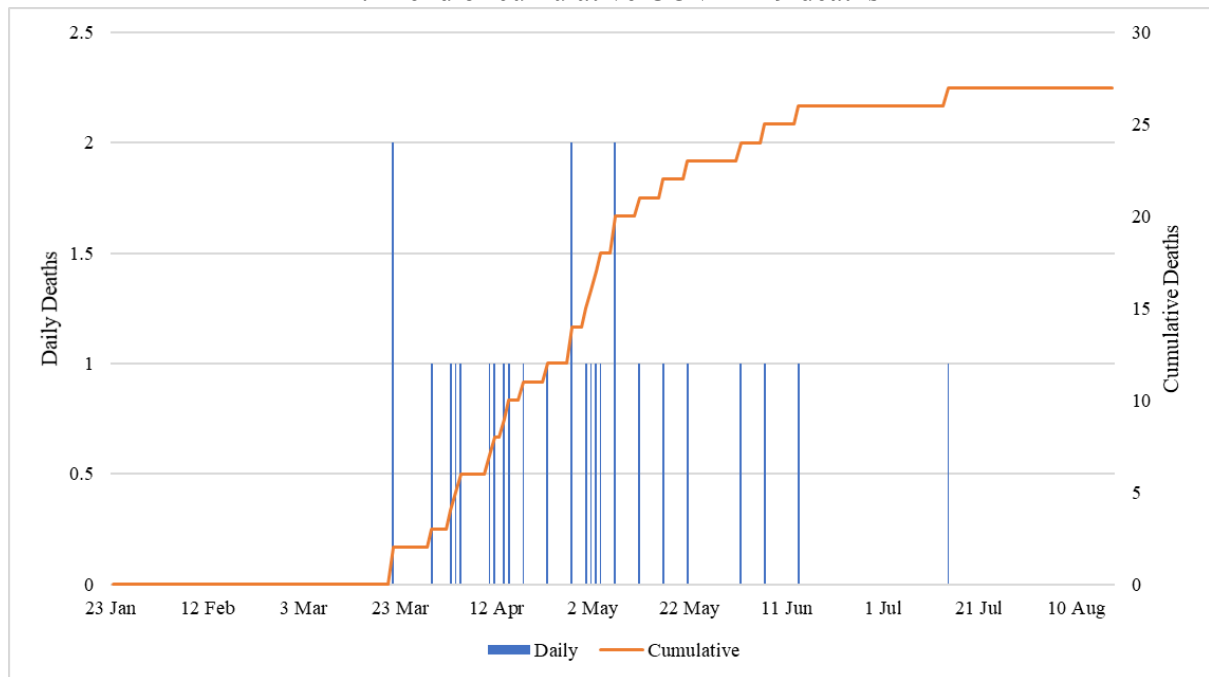
A. Appendix Figures and Tables

FIGURE A1. Spread of COVID-19 in Singapore

A. Trend of confirmed COVID-19 cases



B. Trend of cumulative COVID-19 deaths



SOURCE: Singapore Ministry of Health (2020).

FIGURE A2. Trends of Household Consumption Spending

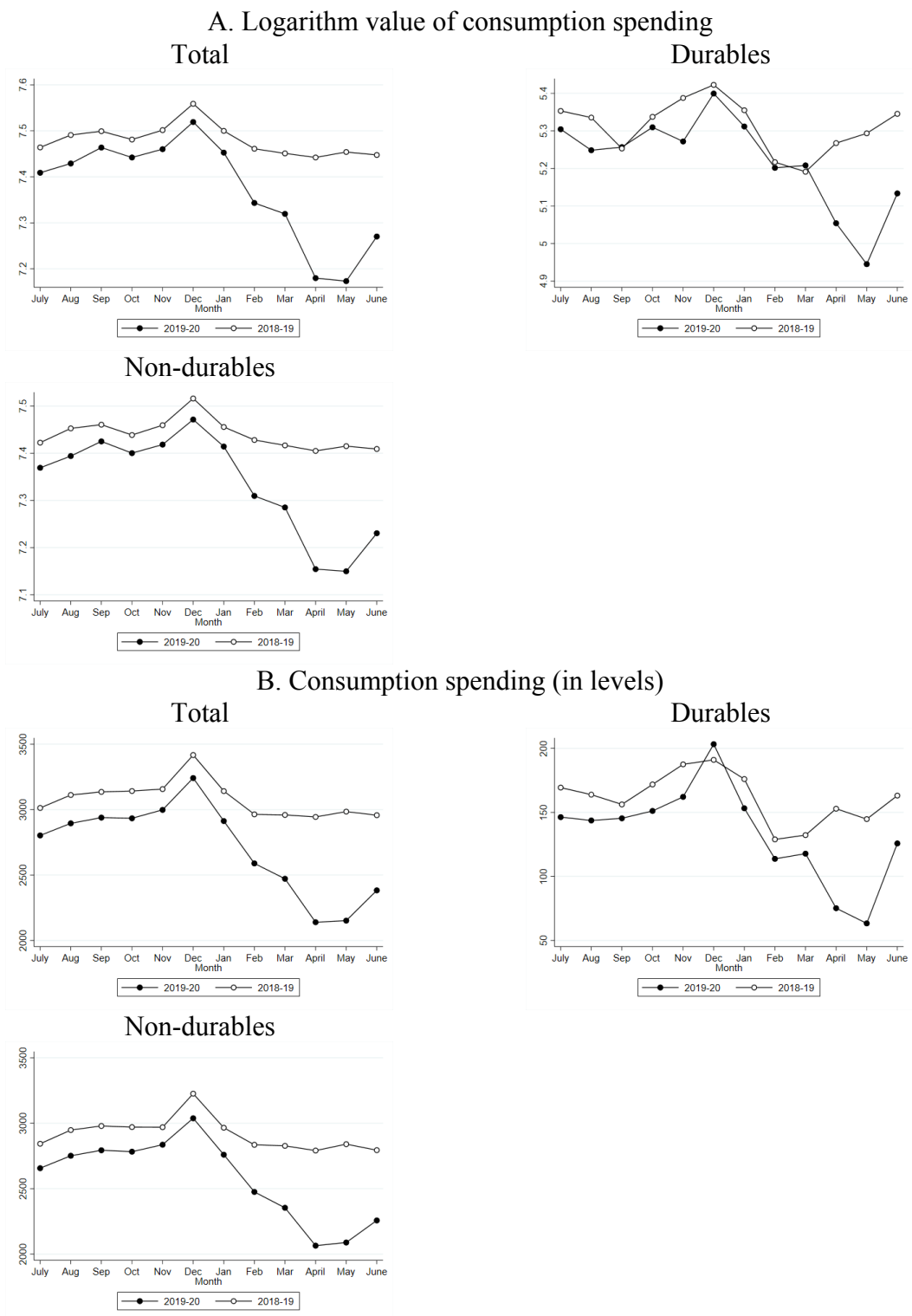
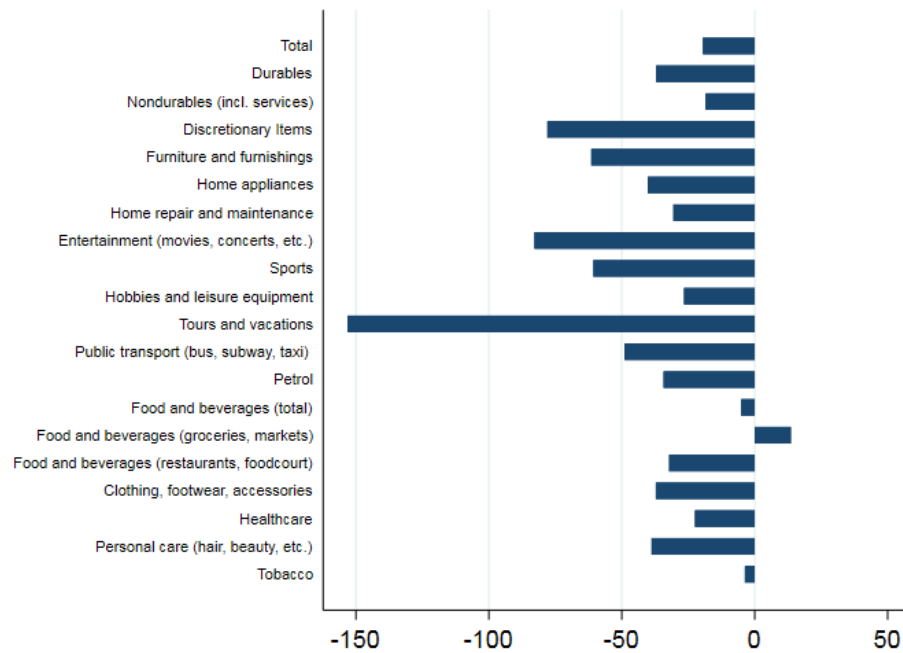
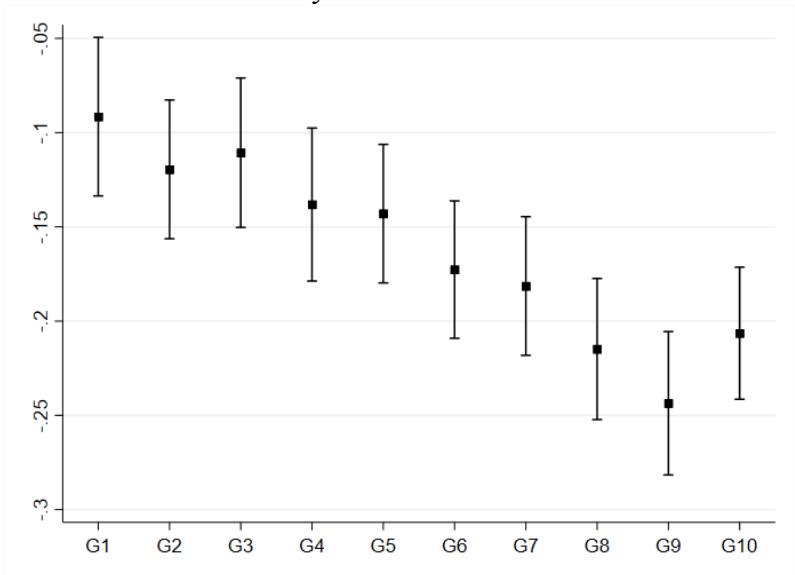


FIGURE A3. Percentage Change in Spending By Category



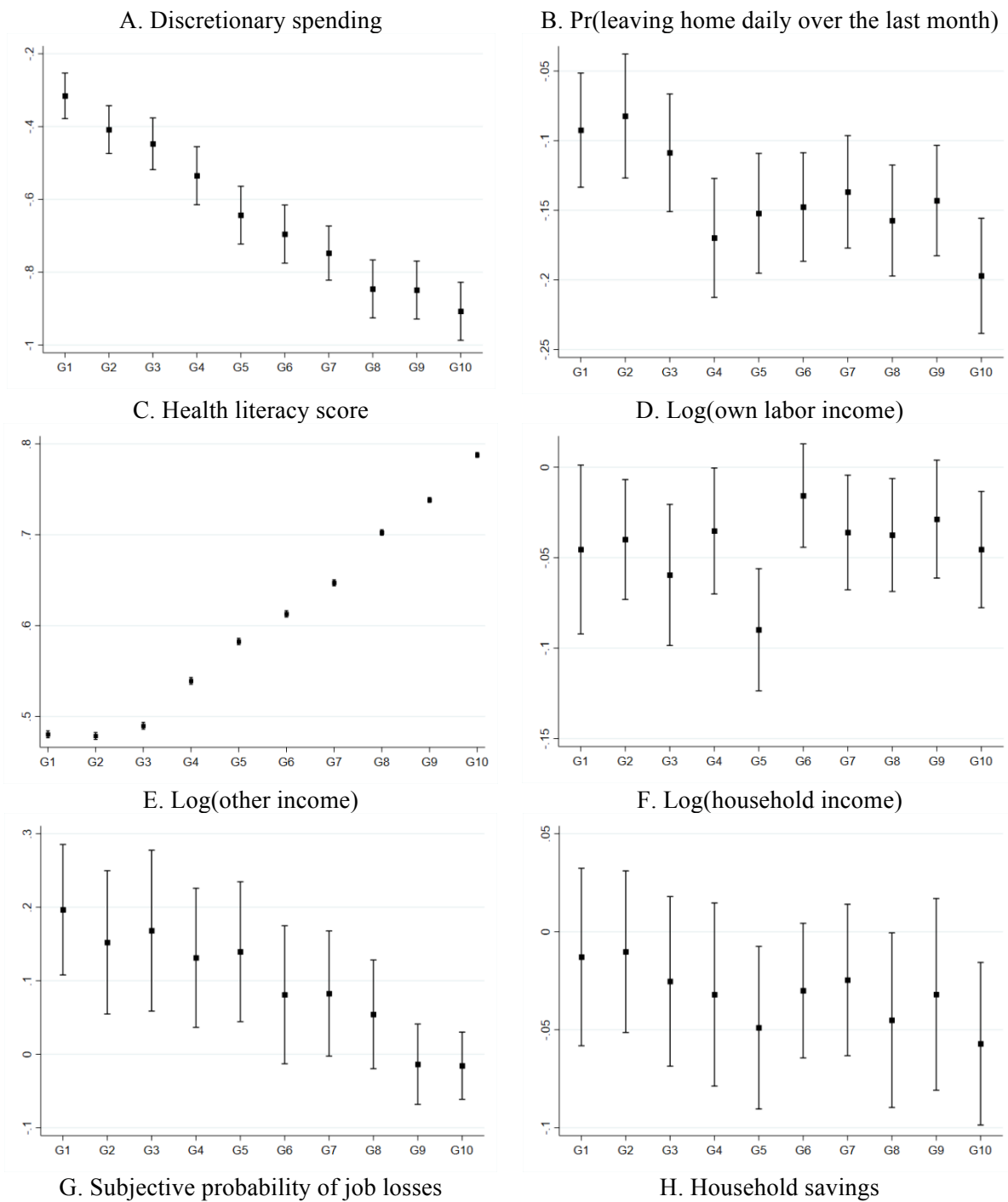
NOTE: Percentage change is computed as the estimated spending change in April 2020 using equation (1) (in levels) divided by mean spending in January 2020.

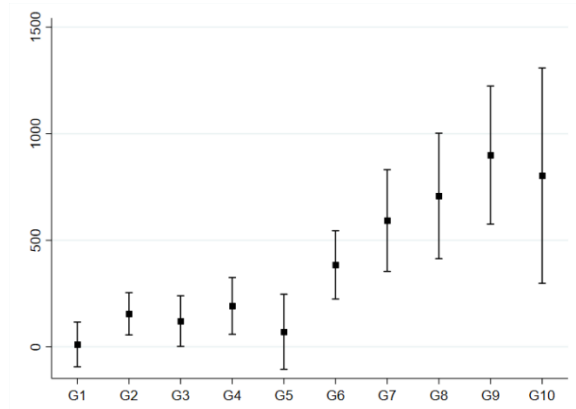
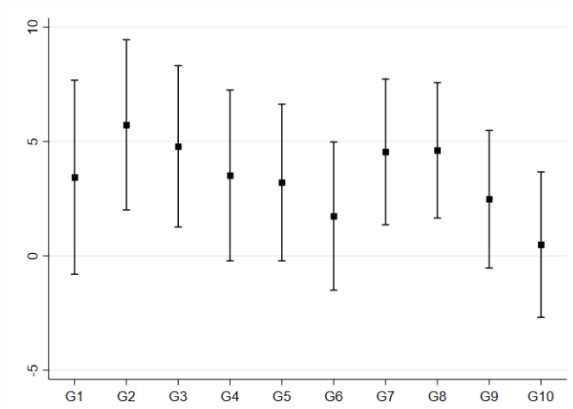
FIGURE A4. Average household consumption spending reduction during COVID-19 by wealth decile



NOTES: G1 denotes the lowest (poorest) decile and G10 denotes the highest (richest) decile. Square dots indicate the coefficient estimates of average reductions in total household consumption spending during the COVID-19 period in each wealth decile. Caps indicate 95% confidence intervals. Standard errors are clustered at the household level and corrected for heteroskedasticity.

FIGURE A5. Mechanisms for heterogeneous consumption spending responses by wealth





NOTES. Discretionary spending includes entertainment, sports, hobbies, tours, public transportation, petrol, clothing, and home repairs and maintenance. The results are robust if we further include durables in discretionary spending. The Pearson correlation between an individual's health literacy and his/her household net worth is 0.31. We use income reported by households' financial respondents. Total household income includes four parts: households' financial respondents' labor income, their spousal labor income, households' other income, and private transfers. Square dots represent point estimates. Caps indicate 95% confidence intervals. Standard errors are clustered at the household level in Panels A, C–F, and H and at the individual level in Panels B and G and corrected for heteroskedasticity.

TABLE A1. Pre-COVID-19 summary statistics

	Mean (SD)		
	January 2020	May 2020	January 2019
	(1)	(2)	(3)
Age	63.2 (6.40)	63.5 (6.36)	62.2 (6.42)
Completed secondary education	.42 (.49)	.42 (.49)	.42 (.49)
Completed tertiary education	.36 (.48)	.36 (.48)	.36 (.48)
Ethnic Chinese	.87 (.34)	.87 (.34)	.87 (.34)
Married	.79 (.41)	.79 (.41)	.79 (.41)
Number of children	2.92 (1.14)	2.91 (1.13)	2.92 (1.13)
Household size	2.55 (1.38)	2.55 (1.37)	2.63 (1.41)
Employed (paid work)	.48 (.50)	.45 (.50)	.50 (.50)
Self-employed	.08 (.27)	.08 (.29)	.09 (.28)
Full-time work	.71 (.45)	.66 (.47)	.71 (.45)
Household consumption spending	2,998 (3,652)	2,203 (2,761)	3,221 (4,242)
Household net worth	1,175,899 (1,628,542)	1,191,534 (1,640,842)	1,159,858 (1,491,679)
Household total income	4,797 (5,331)	4,842 (5,758)	4,386 (5,305)
Own labor income	3,642 (3,965)	3,589 (3,780)	3,674 (3,990)
Having any chronic condition	.65 (.48)	.65 (.48)	.65 (.48)
Number of individuals	7,569	7,557	7,791

NOTES: The statistics are based on the SLP wave collected in January 2020. Monetary units are in 2019 Singapore dollars.

TABLE A2. Short-run impact of COVID-19 on household consumption spending

A. Dependent variable: Log(consumption spending)			
	Total spending	Durable spending	Non-durable spending
	(1)	(2)	(3)
Season×July	-0.005 (0.012)	0.011 (0.067)	-0.009 (0.011)
Season×August	-0.001 (0.011)	-0.057 (0.067)	-0.005 (0.011)
Season×September	0.028** (0.011)	0.062 (0.068)	0.022** (0.011)
Season×October	-0.002 (0.011)	0.004 (0.067)	-0.006 (0.011)
Season×November	0.006 (0.011)	-0.021 (0.070)	0.001 (0.011)
Season×December	0.015 (0.011)	0.052 (0.061)	0.004 (0.010)
Season×February	-0.072*** (0.010)	-0.004 (0.062)	-0.078*** (0.010)
Season×March	-0.089*** (0.011)	-0.022 (0.066)	-0.095*** (0.010)
Season×April	-0.226*** (0.011)	-0.202*** (0.071)	-0.220*** (0.011)
Season×May	-0.243*** (0.011)	-0.331*** (0.071)	-0.234*** (0.011)
Season×June	-0.142*** (0.012)	-0.162** (0.069)	-0.148*** (0.011)
Observations	118,425	31,576	118,408
R-squared	0.859	0.471	0.864

NOTES: Standard errors are clustered at the household level and corrected for heteroskedasticity. *** p<0.01, ** p<0.05, * p<0.1.

B. Dependent variable: Consumption spending (in levels)

	Total spending (1)	Durable spending (2)	Non-durable spending (3)
Season×July	74.113 (56.425)	4.114 (17.632)	69.999 (53.140)
Season×August	83.374 (58.333)	7.745 (17.872)	75.629 (55.277)
Season×September	99.926 (62.226)	16.227 (17.705)	83.700 (59.744)
Season×October	31.425 (59.888)	4.868 (18.088)	26.557 (56.633)
Season×November	113.693* (59.391)	2.074 (18.897)	111.619** (56.008)
Season×December	83.538 (56.348)	37.927** (17.157)	45.611 (53.962)
Season×February	-150.502*** (52.170)	8.749 (14.282)	-159.251*** (49.961)
Season×March	-252.125*** (54.416)	9.108 (15.828)	-261.234*** (51.680)
Season×April	-564.147*** (52.449)	-56.906*** (16.901)	-507.241*** (49.286)
Season×May	-602.185*** (53.091)	-59.977*** (15.208)	-542.208*** (50.141)
Season×June	-365.531*** (56.408)	-15.052 (17.283)	-350.479*** (53.369)
Observations	118,425	118,425	118,425
R-squared	0.725	0.200	0.724

NOTES: Standard errors are clustered at the household level and corrected for heteroskedasticity. *** p<0.01, ** p<0.05, * p<0.1.

TABLE A3 Associations between household consumption spending and household income during the COVID-19 period

Dep. Var.	Total household consumption spending				
	Feb-20	Mar-20	Apr-20	May-20	Jun-20
	(1)	(2)	(3)	(4)	(5)
Total household income	0.346*** (0.0083)	0.296*** (0.0076)	0.268*** (0.0066)	0.267*** (0.0073)	0.294*** (0.0081)
Observations	4,880	4,901	4,993	4,937	4,932
R-squared	0.390	0.367	0.387	0.339	0.336

NOTES: We use the same set of control variables as used in the main specifications. Standard errors are clustered at the household level and corrected for heteroskedasticity. *** p<0.01, ** p<0.05, * p<0.1.

B. Details of the Singapore Government's Budget Measures in response to COVID-19

On May 27, 2020, the Singapore government announced four budget measures: the Unity Budget, Resilience Budget, Solidarity Budget, and Fortitude Budget.

The Unity Budget was announced on February 18, 2020 to distribute various types of family support measures. The size of the budget was S\$6.4 billion (US\$4.6 billion). The specifics of the support measures are as follows:

1. One-off cash payout of S\$100–300 depending on income
2. Additional \$100 cash payout for each parent with a child below 21
3. S\$100 Grocery Voucher for Singaporeans in need
4. S\$100 PAssion Card top-up for Singaporeans aged 50 years and above
 1. PAssion Card is a membership card that Singaporeans can use to pay for community center courses, public transport, groceries, and visits to places of interest such as Singapore Zoo.
5. The value of regular voucher payments (GST Voucher, U-Save) for Singaporeans living in public housing doubled

The Resilience Budget was announced on March 26, 2020, as COVID-19 continued to spread in Singapore and the global economy nosedived into an unprecedented level of economic uncertainty. The budget size was S\$48.4 billion (US\$33.6 billion), which is seven times larger than the Unity Budget. The specifics of the support measures (among others) are as follows:

1. Amount of cash transfer announced in the Unity Budget tripled to S\$300–900.
2. Additional cash payout for each parent with a child below 21 tripled from \$100 to \$300
3. Enhanced Workfare Special Payment (Singapore's wage support program) of S\$3,000 this year for low-wage workers
4. Grocery Voucher tripled for Singaporeans in need from S\$100 to S\$300
5. \$100 PAssion Card top-up for Singaporeans aged 50 years and above in cash instead
6. One-year freeze on all government fees and charges from April 1, 2020 to March 31, 2021
7. One-year suspension of university and polytechnic student loan repayment and interest charges from June 1, 2020 to May 31, 2021
8. Three-month suspension of late payment charges on Housing and Development Board mortgage arrears
9. Low- and middle-income workers (Singapore citizens and permanent residents aged 16 and above) who become unemployed between May and September 2020 will receive a monthly grant of S\$800 for three months while looking for a job or undergoing job training.
 1. Applicants should have had a monthly household income of not more than S\$10,000 or per capita household income of not more than S\$3,100 per month before unemployment and they should not live in a property with an annual value of not more than S\$21,000.
 2. The self-employed and interns are not eligible

The Solidarity Budget measures were announced on April 6, 2020 as the grim situation continued. The size of the budget was S\$5.1 billion. The key component of this budget was an additional S\$300 cash payout for every adult Singaporean citizen in addition to the previously announced cash payments. The first cash payment of S\$600 was disbursed

in April 2020 (bank transfers by April 14; checks by April 30), while the remainder of the cash payment was disbursed in June 2020. The measures also include (but are not limited to) the following:

1. The government will fund 75% of the first S\$4,600 of gross monthly wages paid in April and May 2020 for every local worker
2. Eligible self-employed workers will receive three quarterly cash payments of S\$3,000 in May, July, and October 2020.
3. Employers will receive waivers of Foreign Worker Levies for hiring a low-skilled foreign worker amounting to S\$750 per month due in April and May 2020 and will be entitled to a rebate of S\$750 per month for levies paid in 2020 for each work permit or S-Pass holder.
4. The government's risk share of loans for small and medium-sized enterprises (SMEs) to be raised from 80% to 90% (under the Temporary Bridging Loan Programme). SMEs can opt to defer principal payments until the end of 2020.

The Fortitude Budget measure of S\$33 billion was announced on May 26, 2020 (yet to be legislated). It expands the previous components of the government support for COVID-19 such as wage subsidies and foreign worker levy waiver. It also includes new measures such as job creation (traineeship programs), deferral of the public pension contribution rate increase for senior workers, and mandatory waiver of rents for SMEs badly hit by COVID-19. For details, visit <https://www.gov.sg/article/a-summary-of-the-fortitude-budget-2020>.

C. Variable Definitions

Household spending

The SLP collects spending information for the following exclusive subcategories (raw variable names are in parentheses).

1. Mortgage: interest and principal (c001)
2. Property tax (c002)
3. Home and content insurance (c003)
4. Rent (c004)
5. Utilities and other fuels: water supply, electricity, gas, other fuels, refuse disposal (c005)
6. Communication: internet, telephone, handphone, cable TV subscription (c006)
7. Furniture and furnishings: furniture, carpets, household textiles, glassware, tableware, household utensils (c007)
8. Home repair and maintenance: materials, tools, and services for maintenance and repair of home (c008)
9. Housekeeping supplies: cleaning and laundry products (c009)
10. Domestic and housekeeping services: cost of hiring maids, baby sitters, dry cleaning and laundry services. (c010)
11. Food and beverages (including alcohol): Purchased in grocery shops, provision shops, supermarkets, wet markets, or other stores (c011)
12. Dining and/or drinking out: in restaurants, cafes, pubs, hawker centers, food courts, coffee shops, canteens, street vendors, including take-away and home delivery food (c012)
13. Tobacco: cigarettes and other tobacco products (c013)
14. Clothing, footwear, jewelry, watches, accessories (c014)
15. Personal care products and services: including hair care, beauty, grooming, and skin products; spending on haircut, beauty treatment, manicure/pedicure, etc. (c015)
16. Health insurance premium (c016)
17. Prescription medications: out-of-pocket cost and anything paid from Medisave for prescription (c017)
18. Other medications: out-of-pocket cost and anything paid from Medisave for traditional medicines (e.g. Chinese and Ayurvedic medicine), over-the-counter medications, other medical products (e.g. wheelchair, crutches) and therapeutic equipment (c018)
19. Outpatient services: out-of-pocket cost and costs paid from Medisave for visits to doctors, traditional physicians (e.g. traditional Chinese physicians), physiotherapists, and psychologists; eye care and dental service fees; lab tests. (c019)
20. Hospital services: out-of-pocket cost and costs paid from Medisave for hospital and nursing home care (c020)
21. Home nursing: hiring costs of a helper due to health problems (do not include domestic help services) (c021)
22. Entertainment: including tickets to movies, sporting events, concerts, and museums. (c022)
23. Sports: including gym, exercise equipment such as bicycles, and boats, etc.(c023)
24. Hobbies and leisure equipment: including photography, stamps, reading materials (newspapers, magazines, books), camping, gardening, pets, electronic entertainment (e-magazines, e-books, iTunes, Netflix). (c024)
25. Package tours and vacations: including transportation, accommodation, and recreational expenses on tours and trips (c025)
26. Vehicle payments: interest and principal (c026)

27. Road use fees: road taxes, road use charges (e.g. ERP), parking including traffic / parking fines (c027)
28. Vehicle insurance (c028)
29. Petrol (c029)
30. Vehicle repair and maintenance, including VICOM inspection and other vehicle related services (c030)
31. Spending on public transportation including mass rapid transit (MRT; subway name in Singapore), taxi, bus (c031)
32. Home appliances (c032)
 - 1) Television
 - 2) DVD/BLU-RAY player and recorder
 - 3) Refrigerator
 - 4) Microwave
 - 5) Vacuum cleaner
 - 6) Washing machine
 - 7) Clothes dryer
 - 8) Air conditioner
33. Education including school fees, private tuition fees, books and supplies, assessment papers, study guides (c033)
34. Life insurance (term policies only, excluding premiums for plans with a saving component) (c034)
Other insurance such as travel insurance or maid insurance (c035)
35. Contributions to religious or charitable organizations (c036)
36. Cash gifts to families or friends (c111)
37. Any other spending (c038)

We define total household consumption spending as the sum of Nos. 1–35 and 38. We define durables spending as the sum of Nos. 7, 8, 30, and 32 and non-durables spending as the remaining household consumption spending. The total household consumption spending measure does not include giving behavior (cash gifts to families, relatives, and friends and donations to charities or religious organizations).

Labor Market Outcomes

1. Employment is coded 1 if a respondent is undertaking paid work at the time of the survey participation, 0 otherwise.
2. Self-employment is coded 1 if a respondent is self-employed at the time of the survey participation, 0 otherwise.
3. Full-time work status is coded 1 if a respondent works 35 hours or more per week and 0 otherwise, conditional on employment or self-employment. The SLP does not collect information on a continuous measure of work hours. Instead, it asks if a respondent works 35 hours or more per week, fewer than 35 hours per week, or it varies (sometimes fewer, sometimes more than 35 hours per week). We consider those who work 35 hours or more as full-time workers.
4. Labor income, measured conditional on working, is the response to the following question: “How much was your total income from work in the month of [last month] before taxes and other deductions? If you had more than one job, then please report the total from all jobs [not spouse income from work].”

Other variables

1. Chronic health conditions

We use information on whether a respondent has any chronic health condition including cancer, diabetes, stroke, heart problems, hypertension, arthritis, and psychiatric problems. The SLP asks respondents each month whether he/she has been told by a doctor that he/she has any of these conditions.

2. Household net worth is total household assets net of total household debts.
3. The health literacy score is adapted from the existing scale used in the public health literature (Chew et al. 2004). The sum of the following (recoded) raw questions asked in Wave 9 (April 2016):
 1. How confident are you filling out medical forms by yourself? (s00410)
 2. How often do you have problems learning about your medical condition because you find it difficult to understand the information provided? (s00420)
 3. How often do you have someone (like a family member, hospital/clinic worker, or caregiver) help you read hospital (or other medical) material? (s00430)
4. Total household income is the sum of one's own labor income, one's spouse's labor income (if married), income from families, relatives, and friends, and any other income (e.g., welfare benefits, rental income, pension benefits)

Appendix Reference

Chew, L. D., Bradley, K. A. and Boyko, E. J., 2004. Brief Questions to Identify Patients with Inadequate Health Literacy. *Health*, **11**, 12.